THIRD FIVE-YEAR REVIEW REPORT FOR TOWER CHEMICAL COMPANY SUPERFUND SITE LAKE COUNTY, FLORIDA

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Prepared by

U.S. Environmental Protection Agency
Region 4
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Date

Table of Contents

Tables

Figures

LIST OF ABBREVIATIONS AND ACRONYMS

alpha-BHC	alpha-hexachlorocyclohexane
ARAR	Applicable or Relevant and Appropriate Requirement
bls	Below Land Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DCBP	4,4'-dichlorobenzophenone
DDD	4,4'-dichlorodiphenyldichloroethane
DDE	4,4'-dichlorodiphenyldichloroethylene
DDT	4,4'-dichlorodiphenyltrichloroethane
DPT	Direct Push Technology
EPA	United States Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FYR	Five-Year Review
GCTL	Groundwater Cleanup Target Level
HQ	Hazard Quotient
IC	Institutional Control
IROD	Interim Record of Decision
ISCO	In-Situ Chemical Oxidation
ISS	In-Situ Solidification/Stabilization
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
MNA	Monitored Natural Attenuation
MOA	Memorandum of Agreement
MW	Monitoring Well
NCP	National Contingency Plan
NPL	National Priorities List
NAI	No ARAR Identified
O&M	Operation and Maintenance
OU	Operable Unit
PW	Private Well
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
RV	Recreational Vehicle
SJRWMD	St. Johns River Water Management District
SQG	Sediment Quality Guideline
SVOC	Semi-Volatile Organic Compound
SCTL	Soil Cleanup Target Level
1,1,1-TCA	1,1-trichloroethane

TCC	Tower Chemical Company
UU/UE	Unlimited Use and Unrestricted Exposure
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Tower Chemical Co. Superfund site (the Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of three operable units (OUs). This FYR addresses all three OUs. OU1 addressed contamination in the soil, surficial aquifer, surface water and sediment. OU2 addressed potable well contamination near the Site. OU3 addresses site-wide soil, tributary sediment and groundwater contamination; OU3 supersedes OU1 and OU2.

EPA Remedial Project Manager (RPM) Karl Wilson led the FYR. Participants included community involvement coordinator L'Tonya Spencer, Florida Department of Environmental Protection (FDEP) representative Kevin McCranie, and EPA contractor support from Amanda Goyne and Brice Robertson of Skeo. The review began on 8/9/2017.

Site Background

The 16-acre Site is located in Clermont, Lake County, Florida (Figure 1). From 1957 until 1980, Tower Chemical Company (TCC) made and stored pesticides onsite. During operation, TCC discharged wastewater into a 0.5-acre, unlined percolation/evaporation pond, which was located over a relict sinkhole. TCC also burned and buried solid wastes in a 1.5-acre burn/burial area and disposed of acidic wastewater on a spray irrigation field southwest of the wastewater pond (Figure 1). These actions contaminated site soils, groundwater, surface water and sediments.

The site property is used for commercial purposes. A storage facility for recreational vehicles (RVs), boats, trailers and other commercial vehicles operates onsite. A small auto body shop operates on the eastern side of the site. Other site features include an abandoned office building, paved areas, a gated fence and monitoring wells. The EPA expects future site use to remain commercial/industrial. Land uses in the site area include agricultural, residential and commercial/industrial. Refer to Appendix A for additional resources, Appendix B for site status information and Appendix C for a chronology of site events.

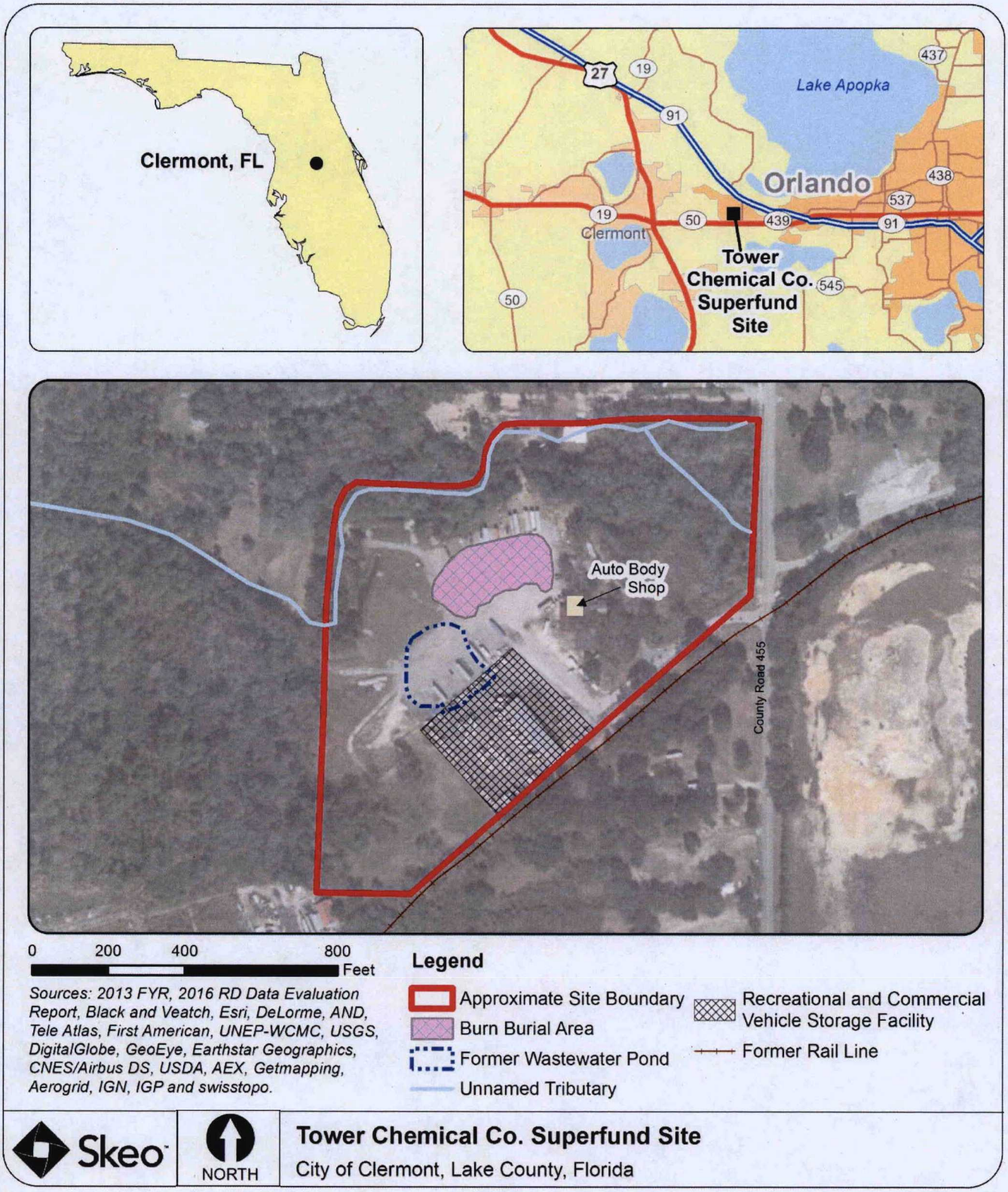
The Site is generally flat with only about 5 feet of relief. The Site drains into swampy areas, which drain into the unnamed tributary north of the Site, which drains into the Gourd Neck of Lake Apopka located

northeast of the Site. A dominant hydrogeological feature at the Site is a relict sinkhole under the former wastewater pond area, where sands provide a hydraulic connection between the Floridan aquifer and the surficial aquifer. The Hawthorn Clay, a dense clay bed, acts as a confining unit between the Floridan and surficial aquifers across the rest of the Site. Deep groundwater at the Site is found in the Ocala Limestone, which is the uppermost unit of the Floridan aquifer system and functions as a water-yielding hydraulic unit. The predominant horizontal direction of groundwater flow for both the surficial and Floridan aquifers in the site area is to the north and northeast. However, in the surficial aquifer, site groundwater level measurements indicate a slight gradient to the south, which suggest a groundwater divide or mound through the central portion of the Site.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Tower Chemical Co.		
EPA ID: FLD004065546		
Region: 4	**State:** Florida	**City/County:** Clermont/Lake
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the Site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name: Karl Wilson (EPA), Amanda Goyne (Skeo) and Brice Robertson (Skeo)		
Author affiliation: EPA and Skeo		
Review period: 8/9/2017 - 4/18/2018		
Date of site inspection: 9/27/2017		
Type of review: Policy		
Review number: 3		
Triggering action date: 4/18/2013		
Due date ***(five years after triggering action date)***: 4/18/2018		

Figure 1: Site Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In May 1980, the wastewater pond contents overflowed into an adjacent swamp and entered the unnamed stream west of the Site. The Florida Department of Environmental Regulation (FDER), predecessor to FDEP, found that acidic wastewater reached the Gourd Neck of Lake Apopka, where it affected aquatic vegetation. FDER ordered TCC to stop all discharges from the Site; in December 1980, all production operations stopped at TCC.

The EPA finalized the Site on the National Priorities List (NPL) in September 1983. The EPA completed the OU1 Remedial Investigation and Feasibility Study (RI/FS) in July 1987. The EPA completed the OU2 RI/FS in June 1999 and an OU2 supplemental RI in August 2001. For more information on these OUs, refer to Appendix D. The EPA completed the OU3 RI/FS in September 2006, which addressed residual site-wide soil and groundwater contamination following early EPA removal actions. The OU3 RI/FS found that surface soils were contaminated with pesticides, arsenic and copper, with elevated concentrations in the burn/burial area. Subsurface soils in the wastewater pond and burn/burial areas were contaminated with 4,4-dichlorobenzophenone (DCBP) and chlorobenzilate. The OU3 RI/FS also determined that site groundwater was contaminated with DCBP, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and heavy metals. The OU3 RI/FS used the same human health and ecological risk assessment as the OU2 RI/FS. The OU2 human health risk assessment concluded that the Site posed unacceptable risks for current and future receptors in surficial groundwater and for future child residents in the surficial and Floridan aquifers. The ecological risk assessment concluded that the Site poses negligible ecological risk.

Response Actions

In June and July 1983, the EPA conducted an emergency removal action. Removal activities included excavating and shipping about 130 cubic yards of pond sediments, 2,370 cubic yards of contaminated soils from the burn/burial area, and 150 empty drums off site for disposal. The EPA backfilled the excavated wastewater pond and burn/burial area with clean fill and capped them with an 8- to 12-inch-thick clay layer to stop downward migration of residual contaminants into the groundwater. The two areas were contoured to control surface water runoff and enclosed within a chain-link fence to prevent public access. From February 1988 to July 1990, the EPA completed a second removal action to address contaminated storage tanks, concrete pads and underlying contaminated soils. These excavated materials were contained onsite and have been addressed through the Site's final soil and sediment remedy.

OU1 and OU2

The EPA issued the OU1 Record of Decision (ROD) on July 9, 1987. The EPA issued the OU2 Interim Record of Decision (IROD) on August 23, 2000. For more information on OU1 and OU2 response actions, refer to Appendix D.

OU3

The EPA issued the OU3 ROD on September 14, 2006, to address remaining site-wide soil, tributary sediments and groundwater contamination. The OU3 ROD superseded the previous OU1 and OU2 RODs. The remedial action objectives (RAOs) established in the 2006 ROD were:

Soil

- Prevent ingestion of, inhalation of and direct contact with surface soil that contains contaminant concentrations in excess of the remediation goals.
- Control migration and leaching of contaminants in surface and subsurface soil to groundwater that could result in groundwater contamination in excess of maximum contaminant levels (MCLs) or remediation goals.
- Prevent ingestion or inhalation of soil particulates in air, for soil that contains contaminant concentrations in excess of the remediation goals.
- Permanently and/or significantly reduce the mobility, toxicity or volume of characteristic hazardous waste with treatment.
- Control future releases of contaminants to ensure protection of human health and the environment.

Groundwater

- Prevent ingestion of groundwater having contaminant concentrations in excess of remediation goals.
- Restore the groundwater aquifer system by cleanup to the remediation goals, and prevent the migration of the pollutants beyond the existing limits of the known contaminant plume or established point of compliance.
- Prevent discharge of groundwater contaminants to surface water bodies that would cause surface water quality standards to be exceeded.
- Control future releases of contaminants of concern (COCs) to groundwater to ensure protection of human health and the environment.

Sediment

- Protect sediment biota and wetland environment based on State of Florida sediment quality guidelines (SQGs) threshold effects concentrations.

The major remedy components included in the OU3 ROD were:

- Excavation of contaminated surface soils exceeding soil remediation goals in the vadose zone (anticipated to be the top 2 to 4 feet of soil) and selected subsurface soils in the saturated zone (down to 12 feet below land surface (bls)), consolidation and off-site disposal.
- Wetland delineation and delineation of sediment contamination in the off-site wetland and surface water discharge areas west of County Road 455 that exceed the SQGs based on threshold effect concentrations for site-related contaminants including copper.
- Excavation of contaminated sediments exceeding the SQGs based on threshold effect concentrations.
- Treatment of remaining contaminated subsurface soils via an in-situ biodegradation and bioventing treatment train with possible physical/chemical treatment enhancements.
- Treatment of contaminated groundwater at the Site exceeding groundwater remediation goals via in-situ bioaugmentation.
- Replacement of temporary carbon filter systems on nearby residential drinking water wells with permanent connections to the public water supply.

- Implementation of monitored natural attenuation (MNA) to reach inorganic groundwater remediation goals and to reach remaining organic groundwater remediation goals not attained once the maximum effect of bioaugmentation on the organic contaminants is realized.
- Installation of additional downgradient monitoring wells to further delineate the extent of contamination exceeding remediation goals in the surficial and Floridan aquifers and provide confirmation monitoring that the remedy is effectively mitigating the potential for plume migration.
- Installation of point of compliance monitoring well(s) in the surficial aquifer immediately upgradient of the unnamed creek to confirm the remedy is effective in preventing discharge to surface water exceeding surface water quality standards including toxicity criteria.
- Implementation of temporary institutional controls, under the State of Florida's restrictive covenants process, to restrict onsite groundwater use and residential land use until remediation goals are met.
- Re-evaluation of available toxicological data pertaining to tentatively identified compounds and the continued protectiveness of the remedy during FYRs.

Table 1 summarizes the cleanup goals for surface soils, subsurface soils and groundwater. The 2006 ROD did not include specific remediation goals for sediment. However, the goals were generally defined to meet the Florida SQGs threshold effect concentrations.

Table 1: Site COC Cleanup Goals by Media

COC	Surface Soil ROD Cleanup Goal (mg/kg)[a]	Subsurface Soil ROD Cleanup Goal (mg/kg)[a]	Surficial Groundwater ROD Cleanup Goal (µg/L)[a]	Deep Groundwater ROD Cleanup Goal (µg/L)[a]
Acetone	NA	NA	6,300	NA
Aluminum	NA	1,900	7,000	7,000
alpha-Hexachlorocyclohexane (alpha-BHC)	0.1	0.0003	0.006	NA
Arsenic	2.1	NA	10	10
Benzene	NA	0.007	1	1
Bromodichloromethane	NA	NA	0.6	NA
Cadmium	NA	2.2	5	NA
Chromium	NA	38	100	100
Chlordane	2.8	9.6	NA	NA
Chlorobenzene	NA	NA	100	NA
Chlorobenzilate	NA	0.1	0.1	0.1
Chlorobenzoic acid	NA	NA	NA	1,400
Chloroform	NA	NA	70	70
Copper	NA	NA	1,300	1,300
DCBP	NA	0.34	21	21
1,4-Dichlorobenzene	NA	NA	75	75

COC	Surface Soil ROD Cleanup Goal (mg/kg)[a]	Subsurface Soil ROD Cleanup Goal (mg/kg)[a]	Surficial Groundwater ROD Cleanup Goal (µg/L)[a]	Deep Groundwater ROD Cleanup Goal (µg/L)[a]
4,4'-dichlorodiphenyldichloroethane (DDD)	4.2	5.8	NA	NA
4,4'-dichlorodiphenyldichloroethylene (DDE)	2.9	18	NA	NA
4,4'-dichlorodiphenyltrichloroethane (DDT)	2.9	11	NA	NA
Dicofol	NA	0.01	0.08	0.08
Dieldrin	0.06	0.002	NA	NA
Diphenyl methanone	NA	NA	180	NA
Iron	NA	5,600	4,700	4,700
Lead	400	220	15	15
Manganese	NA	81	300	300
Methylene chloride	NA	0.02	5	NA
2-Methylnaphthalene	NA	NA	NA	28
3-Methylphenol	NA	NA	35	NA
4-Methylphenol	NA	NA	3.5	NA
Naphthalene	NA	NA	NA	14
Nickel	NA	130	100	100
Toxaphene	0.9	31	NA	NA
Trimethylbenzene	NA	0.3	NA	NA
1,2,3-Trimethylbenzene	NA	NA	NA	10
1,2,4-Trimethylbenzene	NA	NA	NA	10
1,3,5-Trimethylbenzene	NA	NA	NA	10
Vanadium	NA	NA	NA	49

Notes:
[a] Cleanup goals based off Table 7-17 in the 2006 ROD.
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
NA = Not Applicable

Status of Implementation

OU1 and OU2

Refer to Appendix D for detailed information about the status of implementation for OU1 and OU2.

OU3

The 2006 OU3 ROD is currently being implemented. The EPA began the remedial design on September 27, 2006, and completed the contaminated surface soil, selected subsurface soils and sediment component of the remedial design on June 9, 2009. Remedial activities commenced on March 1, 2010. In May 2010, the EPA connected the residences with carbon filter systems to the public water supply, except for two households whose residents chose to continue using their shared well. The EPA performed surface soil and sediment excavation in two phases. Phase I included excavation of contaminated surface soils, selected subsurface soils and sediments from the northern and central portions of the Site, as well as from the eastern and western wetlands. About 49,000 cubic yards of contaminated soils and sediment were excavated and transported to an off-site Resource Conservation and Recovery Act (RCRA) Subtitle D disposal facility. Following excavation, the EPA backfilled excavated areas with clean soil and restored wetland areas. The EPA completed Phase I surface soil and sediment remedial activities in November 2010. Following completion of Phase I activities, the EPA performed three years of wetland restoration planting and monitoring (quarterly for one year and annually thereafter). The final 2013 Annual Wetland Restoration Monitoring Report concluded that planted tree species had been restored; the goal of 80 percent survivorship of planted tree species was met after the first year of planting.

Phase II consisted of excavation of contaminated soils and waste materials unaccounted for in the OU3 remedial design, as well as soils not excavated during Phase I. Phase II surface soil and waste material remedial activities began in March 2011 and were completed in February 2012. About 3,000 cubic yards of contaminated soils were excavated and transported to an off-site RCRA Subtitle D disposal facility. The EPA backfilled excavated areas with clean soil. Phase I and II excavated contaminated surface soils as well as selected subsurface soils and sediments to 12 feet bls.

Limited dewatering/groundwater treatment operations were also conducted during Phase I and Phase II. Phase I dewatering/groundwater treatment operations were conducted from July to August 2010. Approximately 1,743,400 gallons of groundwater were extracted. Phase II dewatering/groundwater treatment operations were conducted from April to May 2011. The EPA released treated water into the western wetlands.

According to the ROD, remaining contaminated subsurface soils and groundwater are to be treated via in-situ biodegradation and treatment with possible physical/chemical treatment enhancements. In 2011, the EPA initiated the remedial design for this component of the ROD. In 2013, the EPA evaluated bench scale results and scale-up costs and concluded that in-situ chemical oxidation (ISCO) with activated persulfate was the most promising technology. However, subsequent studies and pilot tests determined that ISCO was not feasible for the Site. Based on subsequent studies and cost evaluations, the EPA is evaluating in-situ solidification/stabilization (ISS) combined with MNA as a possible method to treat remaining contaminated subsurface soils and groundwater. The EPA is evaluating options to implement ISS with MNA at the Site, but has not finalized selection of this method.

Institutional Control (IC) Review

Table 4 lists the institutional controls associated with areas of interest at the Site. Figure 2 shows the Florida Delineated Contamination Area around the Site. The Florida Delineated Contamination Area restricts well installations. The 2013 FYR recommended that the EPA and the St. Johns River Water Management District (SJRWMD) implement a Memorandum of Agreement (MOA) to further prevent access to contaminated groundwater until it is fully remediated. The EPA and the SJRWMD are

currently engaged in negotiating an MOA establishing cooperative efforts to minimize the potential effects of groundwater contamination in areas within the SFWMD's jurisdiction that are impacted or potentially impacted by Superfund sites. These negotiations include establishing procedures for information sharing and assisting in the implementation of certain institutional controls through the application of regulatory practices within the SFWMD's jurisdiction. Ultimately, the goal is to prevent potential human exposure to contaminated groundwater in areas impacted or potentially impacted by Superfund sites. The intent of the MOA is for the EPA to give the SJRWMD adequate information on contaminant concentrations and extent of contamination at Superfund sites to prevent wells from being permitted within a zone of groundwater contamination, or within close enough proximity to cause the migration of contaminants. In the interim, SJRWMD is aware of the site groundwater contamination and the Florida Delineated Contamination Area has been applying special criteria for the installation of new groundwater wells in the immediate area around the Site.

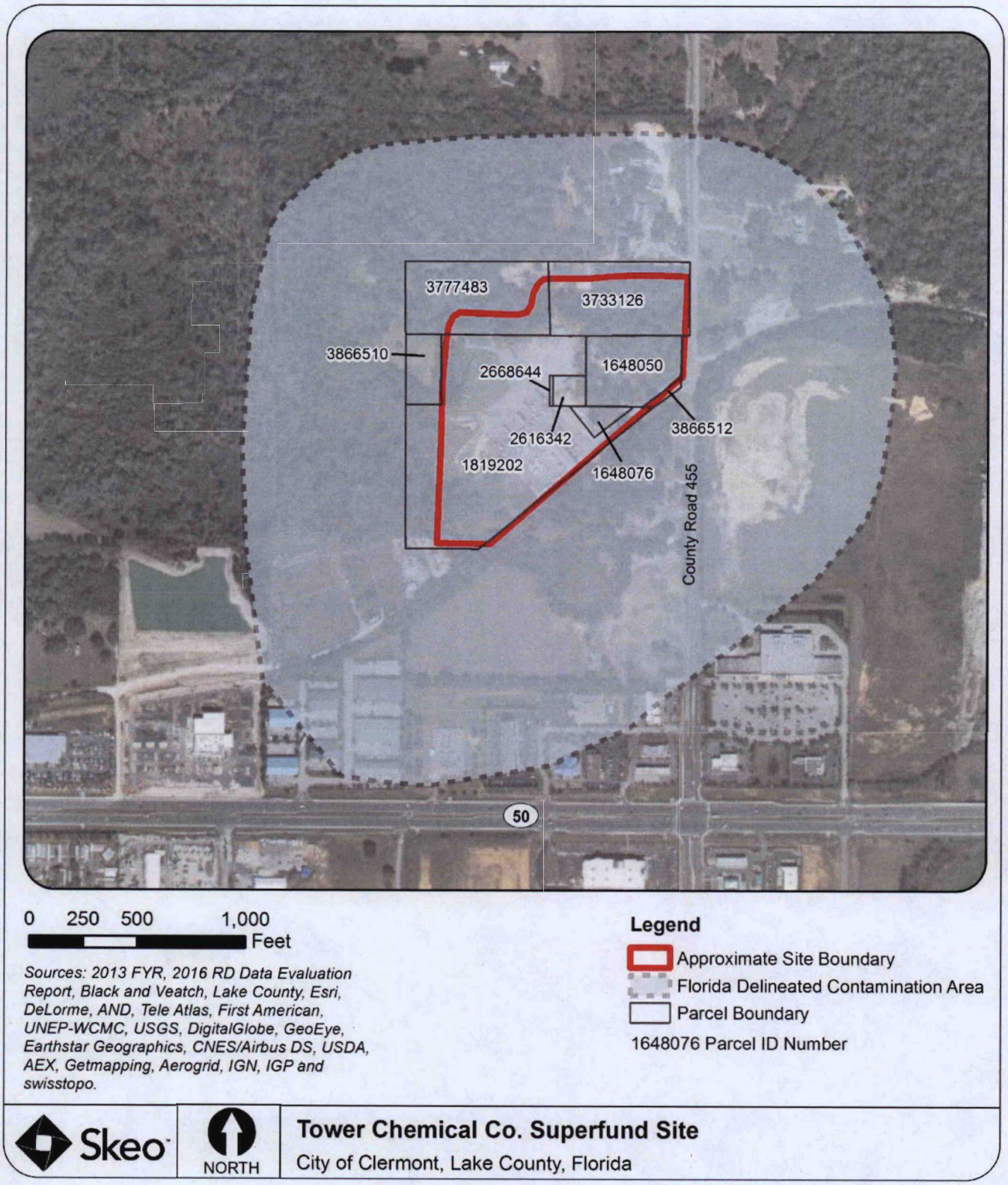
Subsurface soil DCBP contamination above cleanup goals remains 12 feet and more bls. If the selected remedy for subsurface soil leaves this contamination at depth, institutional controls will be needed to restrict excavation where subsurface soil contamination remains. The 2006 ROD called for institutional controls to restrict residential land use. However, contaminated soils above residential standards have been removed to 12 feet bls. Therefore, institutional controls restricting residential land use may not be needed, pending evaluation of the 4,4'-dichlorodiphenyldichloroethane (DDD) cleanup goal (see Question B) and implementation of institutional controls restricting subsurface excavation.

Table 2: Summary of Planned and Implemented Institutional Controls (ICs)

Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	1819202, 2616342, 2668644, 1648076, 3866510, 3866512, 1648050, 3777483, 3733126	Restrict installation of groundwater wells and groundwater use with an MOA.	The Site lies within a Florida Delineated Contamination Area, which restricts well placement.[1] An MOA is needed to restrict contaminated groundwater use.
Soil	Yes	Yes	1819202, 2616342, 2668644, 1648076, 3866510, 3866512, 1648050, 3777483, 3733126	Restrict excavation of remaining contaminated subsurface soils.	Not yet implemented; might be needed pending final subsurface soil remedy selection.

[1] Florida's groundwater delineation information is available online at: https://floridadep.gov/water/source-drinking-water/content/delineated-areas.

Figure 2: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Systems Operations/Operation and Maintenance (O&M)

Formal O&M activities for the Site will begin after completion of the site-wide OU3 remedial action. The 2000 IROD required several maintenance activities for the carbon filters, but these activities are no longer required because the homes now have access to the public water supply. Two residences using one well (upgradient of the site groundwater contamination) chose not to hook up to the public water supply and are responsible for maintenance of the carbon filters if they choose to continue their use.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR as well as the recommendations from the previous FYR and the status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The OU1 remedy was never implemented and has been replaced by the site-wide OU3 remedy.
2	Protective	The OU2 interim remedy at the Site currently protects human health and the environment because potentially affected residents were provided with well-head protection through the installation of carbon filtration units for six potable water wells serving ten residences located in the immediate vicinity of the Site. In May 2010, under OU3, eight of the ten residences using groundwater from five of the six private wells were connected to the public water supply system. Owners of the remaining private well declined connection to the public water supply system. All six of the private wells continue to be included in monitoring for off-site contaminated groundwater migration. The six private wells have not shown Site contaminant impacts in monitoring results implemented as part of the carbon filtration system installation. The latest private well sampling occurred in June 2011. The current cleanup goal for DCBP is 21 µg/L. Private well (PW) 101, PW 102, PW 104, PW 105, PW 106 and PW 107 each had a DCBP concentration of less than 0.08 µg/L during the June 2011 sampling event. Additionally, all six of the private wells are located beyond the current DCBP contaminant plume and therefore are not impacted (see Appendix L for a map detailing the plume and private well locations). PW 102 is the private well closest to the DCBP plume. The 2017 site inspection confirmed that owners at this location only use the private well water for washing trucks and do not use it for any other use. These owners are connected to the municipal water supply for potable water uses. In addition, the well that was not connected to the public water supply system is upgradient of the Site. The owners declined to be connected to the public water supply system. The owners are aware and responsible for maintaining the filters on the well. The EPA will conduct the next sampling event for all private wells by 2021.
3/Site-wide	Will be Protective	The OU3 remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all current exposure pathways that could result in unacceptable

		risks. Institutional controls to restrict groundwater use should be augmented with an MOA between EPA and SJRWMD to prevent access to contaminated groundwater until it is fully remediated. All monitoring wells should be secured. Additional sediment sampling is needed in the eastern wetland to verify if cleanup goals are exceeded. Data results will be used to evaluate if additional response action, including institutional controls, is necessary.

Table 4: Status of Recommendations from the 2013 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
3	Adequate temporary groundwater use restrictions, as called for in the 2006 ROD, have not been implemented.	Implement an MOA between EPA and SJRWMD to prevent access to contaminated groundwater until it is fully remediated.	Ongoing	An MOA has not been implemented between the EPA and SJRWMD to prevent access to contaminated groundwater.	NA
3	Contamination above cleanup goals remains in wetlands.	Verify wetland sediment exceedances and determine if additional response action, including institutional controls, is necessary.	Under Discussion	Additional wetland sampling has not been completed.	NA
3	During the site inspection, unlocked monitoring wells were observed to be in good condition.	Lock all monitoring wells.	Ongoing	During the site inspection for the 2018 FYR, monitoring wells MWS-17, MWS-21 and MW-11 R and F were not locked.	NA

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by a newspaper posting in the Orlando Sentinel in October 2017 (Appendix E). It stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the report will be made available at the Site's information repository, the Cooper Memorial Library, located at 2525 Oakley Seaver Drive, Clermont, Florida 34711.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. Interviews were completed with one nearby resident and two nearby businesses. The interviews are summarized below. Complete interviews are included in Appendix F.

Overall, the interviewees believe that the remedy is effective and is protective of human health and the environment. The resident and one of the businesses interviewed commented that the EPA could keep surrounding neighbors informed through phone calls.

A representative from the Orlando Sentinel contacted the RPM and inquired about the FYR and the status on cleanup at the Site. The Orlando Sentinel ran the following article on October 23, 2017: "Commentary: EPA still working to clean up Tower Chemical Superfund Site." The online article can be found at the following link below:

http://www.orlandosentinel.com/news/lake/os-lk-lauren-ritchie-epa-tower-chemical-cleanup-20171020-story.html

Data Review

Data reviewed for this FYR included three sampling events for dicofol and DCBP (a degradation product of dicofol), conducted to support a remedial design for organochlorine pesticide contamination in groundwater and soil. A summary of these data is presented below. Appendix I contains figures and tables related to this data review.

Groundwater

The EPA sampled groundwater for DCBP and dicofol in site monitoring wells and in 20 locations using direct push technology (DPT) in December 2016 and January 2017 (see Figure 3, some historical data from 2013 and 2015 are also included in this figure). The ROD groundwater cleanup goals for DCBP and dicofol are 21 micrograms per liter (µg/L) and 0.08 µg/L, respectively. DCBP had a higher frequency of cleanup goal exceedances than dicofol. Because DCBP is the primary COC for remaining remedial decisions and is of most concern, this data review focuses on DCBP.

Monitoring Well Results

The purpose of January 2017 groundwater sampling was to monitor DCBP concentrations at the edge of the plume. DCBP concentrations in four of five perimeter shallow monitoring wells (MWS12, MWS14, MWS17 and MW102S) were lower than April 2015 concentrations. The concentration in MWS19 was slightly higher in 2017. Concentrations in 2017 ranged from below detection to 210 µg/L (MWS14). As stated in the March 2017 remedial design report, when reviewing concentration changes over multiple sampling events for multiple perimeter wells, there is no clear increasing or decreasing trend.

Historical data between 2011 and 2015 indicate several exceedances in the shallow zone. The maximum concentration of 5,900 µg/L occurred in 2015 at MW109S, which is in the relict sinkhole area and former wastewater pond area. The highest DCBP detection during 2015 in the Floridan aquifer monitoring wells occurred in MWF15 (36 µg/L). The DCBP concentration in this well during 2011 was 50 µg/L.

DPT Results

The purpose of the DPT groundwater sampling was to help define the 1,000 µg/L contour for DCBP concentrations in groundwater; to help define DCBP concentrations in groundwater throughout the plume; and to help evaluate the depth of DCBP groundwater impacts in and around the sinkhole. DPT sampling occurred at several depth intervals, starting at 16 to 20 feet bls. DPT sampling occurred as deep as 76 to 80 feet at locations DPT011/DPT019, which were at the sinkhole area where groundwater is deeper.

DCBP concentrations exceeded the ROD cleanup goal at 18 of 20 DPT locations (see Table I-1). Only two DPT locations had DCBP concentrations above 1,000 µg/L. At DPT011/DPT019, DCBP was above 1,000 µg/L at multiple depth intervals, with the maximum concentration of 17,000 µg/L at 46 to 50 feet bls (see Table 5 below). Samples from DPT020, also near the sinkhole area, had DCBP above 1,000 µg/L in one depth interval, with a concentration of 3,000 µg/L at 56 to 60 feet bls (see Table I-1). These two locations are also near the former wastewater pond.

Other locations exceeded the DCBP cleanup goal in nearly all depth intervals ranging from 16 to 20 feet bls to 56 to 60 feet bls, but concentrations were below 1,000 µg/L (see Table I-1).

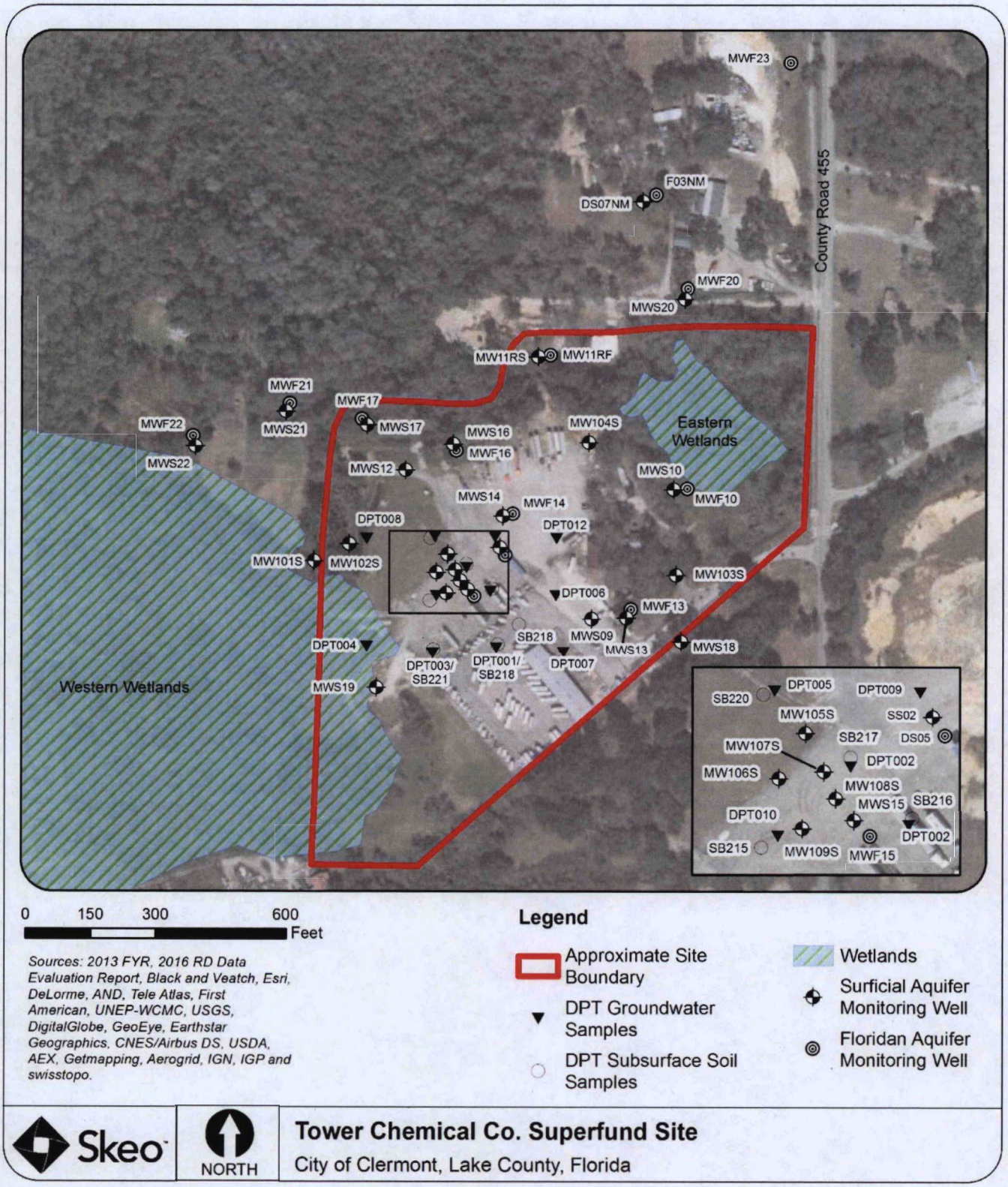
Table 5: Summary of DCBP Concentrations at DPT Location DPT011/019

Depth Interval (feet bls)	Maximum Concentration (µg/L)
16-20	1,600
31-35	8,500
45-50	17,000
56-60	15,000
>60	3,200

Soil

The EPA sampled for DCBP subsurface soil contamination using DPT at 14 locations in December 2016 and January 2017 (see Figure 3 and Table I-2, some historical data from 2012, 2013, and 2014 are also included in the figure). The purpose of the DPT soil sampling was to help define the extent and depths of DCBP impacts in soil and help locate impacted soil for collection of samples for ISS treatability testing. DPT samples were collected at three depths at each location: 17 to 18 feet, 32 to 33 feet and 47 to 48 feet. The ROD cleanup goal for DCBP subsurface soil contamination (340 µg/kg) was exceeded at nine of the 14 locations. The concentrations exceeding the cleanup goal occurred at all three depth intervals and ranged from 490 µg/kg to 20,000 µg/kg. The highest concentration was detected in sample SB218, located at the former wastewater pond. In general, the highest DCBP soil concentrations were near the former wastewater pond.

Figure 3: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Site Inspection

The site inspection took place on 9/27/2017. In attendance were Karl Wilson of the EPA, Kevin McCranie of the FDEP, and Amanda Goyne and Brice Robertson of Skeo. The purpose of the inspection was to assess the protectiveness of the remedy.

Participants began the inspection by discussing some changes that have happened in the last five years. Charlie's Auto Care began operating onsite and is renting a formerly unused building from the site owners, a commercial and RV storage business, which still operates onsite. Mr. Wilson mentioned that he had spoken with the commercial and RV storage business and that they were in good shape following Hurricane Irma in September 2016. The storage business only had to replace the fence's electronic locking system following the hurricane. Participants entered the Site through the entrance to the commercial and RV storage business. The fencing was locked through an electronic system and there was signage reading "No Trespassing."

Participants toured the Site, including the former pesticide packaging building, the former burn/burial area, the former wastewater pond area, the unnamed tributary to Lake Apopka and stormwater features and monitoring wells. The former main building area where pesticide packaging occurred is now an approximately 4-foot-high raised platform with a roof for vehicle storage. Outside the platform is pavement where boats and RVs are stored within a secured fenced area. Participants noted that several monitoring wells were unlocked. Monitoring wells MWS18 had its casing unlocked but the interior was locked. Monitoring wells MWS17 and MWS21 had both their casing and interiors unlocked. Monitoring wells MW11 R and F were not locked or labeled. Mr. Wilson noted that the wetland area to the north of the Site is generally dry, but it had water during the site inspection because of Hurricane Irma. Participants also viewed the eastern wetland and observed that it was well-vegetated and appeared healthy.

Following the site inspection, participants interviewed several nearby residents and business operators. Skeo staff visited the site repository at the Cooper Memorial Library, located at 2525 Oakley Seaver Drive, Clermont, Florida 34711. Site-related documents as recent as 2013 were found at the repository. Refer to Appendix G for a detailed site inspection checklist and Appendix H for site photos.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The site inspection and review of documents, applicable or relevant and appropriate requirements (ARARs) and risk assumptions indicate that the Site's remedy has been mostly implemented and is mostly functioning as intended by site decision documents.

OU1
The OU1 remedy was never implemented and was replaced by the site-wide OU3 remedy.

OU2
Remedial actions performed under the OU2 remedy included carbon filter installation at affected residences. Installation of carbon filters was completed in January 2003 and affected residences have since connected to the public water supply.

OU3

Remedial actions performed under the OU3 remedy to date have included removal and disposal of contaminated surface soils, selected subsurface soils and sediments; backfilling of excavated areas; wetland restoration; and limited dewatering/groundwater treatment operations. Treatment of remaining DCBP contamination in subsurface soil and groundwater is in the remedial design phase. The EPA originally selected ISCO in combination with MNA to treat remaining subsurface soil and groundwater contamination, but determined that this remedy is no longer appropriate. The EPA is now evaluating ISS in combination with MNA as a possible method to treat remaining site contamination, but the EPA has not yet formally selected a method. Groundwater and soil sampling during the FYR period confirmed that the highest concentrations of DCBP contamination are in the former wastewater pond area. It is unclear whether contamination above cleanup goals is present and bioavailable in the eastern wetland, as no additional sampling activities have been performed since the 2013 FYR. The EPA is considering options for addressing this issue, including possibly evaluating bioavailability of contaminants in wetland sediment porewater. The EPA will take appropriate actions based on the outcome and results of these evaluations.

Formal O&M activities, if needed, will begin after completion of the site-wide OU3 remedial action. Some institutional controls are in place at the Site. The Site lies within a Florida Delineated Contamination Area, which restricts well placement. The EPA plans to implement an MOA with SJRWMD to further restrict site groundwater use until it is fully remediated. The 2006 ROD called for institutional controls to restrict residential land use until remediation goals are met. Residential land use restrictions may not be needed, pending evaluation of the DDD cleanup goal (see Question B), because contaminated surface soils, selected subsurface soils and sediments have been removed up to 12 feet bls. However, if the selected remedy for remaining subsurface soil contamination below 12 feet bls leaves this contamination at depth, institutional controls will be needed to restrict excavation in areas of the Site where subsurface soil contamination remains.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Yes. The exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of remedy selection are mostly still valid. The RAOs identified in the 2006 ROD are still valid and there are no new site conditions that could impact their validity. The 2006 ROD cleanup goals are based on the EPA MCLs and groundwater cleanup target levels (GCTLs) and soil cleanup target levels (SCTLs) as established by the State of Florida. Groundwater cleanup goals are still valid and soil cleanup goals are mostly still valid based on current toxicity and standards. As part of this FYR, the EPA completed a residential regional screening level (RSL) evaluation for current surface and subsurface soil cleanup goals. The evaluation found that except for DDD, the cleanup goals for surface and subsurface soils are within or below the EPA's risk management range of 1×10^{-6} to 1×10^{-4} and below the noncancer hazard quotient (HQ) of 1.0 for residential uses. The EPA should evaluate whether the cleanup goals for DDD in surface and subsurface soils need to be updated based on a residential use scenario, or if residential land use restrictions may be needed. The Site is currently used for commercial/industrial purposes and the cleanup goals for DDD in surface and subsurface soils are within or below the EPA's risk management range of 1×10^{-6} to 1×10^{-4} and below the noncancer HQ of 1.0 for commercial/industrial uses. Appendix K contains a detailed toxicity review and Appendix J contains a detailed ARARs review. Exposure assumptions identified in the 2006 ROD have not changed as there is

no access to contaminated site groundwater. However, to be protective in the long term, the EPA should evaluate if additional layers of institutional controls are needed to prevent site groundwater use.

Due to the presence of VOCs in surficial groundwater and an auto body shop operating on the Site, a screening-level vapor intrusion evaluation was conducted (Appendix K). The evaluation used the most current maximum concentrations of VOCs onsite. The analysis demonstrates that the vapor intrusion pathway for industrial/commercial land uses is not an exposure pathway of concern based on current concentrations detected at the Site. If the concentrations increase near this building, then this exposure pathway should be re-evaluated.

While 1,1,1-trichlorethane (1,1,1-TCA) was not an identified COC at the Site, the OU1 1986 RI/FS identified past manufacturing actions that included dipping the tails of plastic worms in a powdered dye and 1,1,1-TCA solution. Historically, 1,4-dioxane was used as a stabilizer for 1,1,1-TCA. Because early site investigations did not sample for 1,4-dioxane, EPA should sample for 1,4-dioxane to make sure it is not present in site media and take additional action if necessary.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

Hurricane Irma hit the Clermont/Orlando area in September 2017. The owners of the commercial and RV storage business replaced the electronic gate unlocking system as a result, but reported no other damage.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OUs without Issues/Recommendations Identified in the FYR:
OU1, OU2

Issues and Recommendations Identified in the FYR:

OU: OU3	**Issue Category:** Institutional Controls			
	Issue: The Site lies within a Florida Delineated Contamination Area, which restricts well placement; however, institutional controls may be needed to restrict use of contaminated site groundwater.			
	Recommendation: Evaluate whether to implement an MOA between the EPA and SJRWMD to prevent access to contaminated groundwater until it is fully remediated.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	11/30/2019

OU: OU3	Issue Category: Remedy Performance			
	Issue: The ROD selected ISCO in combination with MNA for remaining subsurface soil and groundwater contamination, but the EPA has determined this method is no longer an appropriate remedy for remaining subsurface contamination.			
	Recommendation: Select and implement a remedy for remaining subsurface soil and groundwater contamination. Determine if institutional controls are necessary. Modify the remedy through an appropriate decision document.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	10/30/2019

OU: OU3	Issue Category: Remedy Performance			
	Issue: Contamination above cleanup goals may still be present and bioavailable in wetland sediments.			
	Recommendation: Evaluate bioavailability of wetland sediment exceedances and determine if additional response actions, including institutional controls, are needed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	11/30/2021

OU: OU3	Issue Category: Remedy Performance			
	Issue: An RSL evaluation found that the surface and subsurface cleanup goals for DDD are above the EPA's noncancer HQ of 1.0.			
	Recommendation: Evaluate whether the cleanup goals for DDD in surface and subsurface soils should be updated or if institutional controls are needed to restrict residential use of the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	11/30/2021

OU: OU3	Issue Category: Remedy Performance			
	Issue: As stated in the 1986 RI/FS, 1,1,1-TCA was used in a solution during past manufacturing activities at the Site.			
	Recommendation: Sample for 1,4-dioxane, determine if it is present in site media and take additional action if necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	11/30/2021

OTHER FINDINGS

One additional recommendation was identified during the FYR. This recommendation does not affect current and/or future protectiveness.

- Lock and secure all unlocked monitoring wells.

VII. PROTECTIVENESS STATEMENTS

Protectiveness Statement	
Operable Unit: OU1	*Protectiveness Determination:* Protective
Protectiveness Statement: The OU1 remedy was never implemented and has been replaced by the site-wide OU3 remedy.	

Protectiveness Statement	
Operable Unit: OU2	*Protectiveness Determination:* Protective
Protectiveness Statement: The OU2 interim remedy for the Site's potable groundwater currently protects human health and the environment because potentially affected residences were connected to the public water supply system and all private wells are outside the current DCBP plume boundary.	

Protectiveness Statement	
Operable Unit: OU3	*Protectiveness Determination:* Will be Protective
Protectiveness Statement: The OU3 remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all current exposure pathways that could result in unacceptable risks, as contaminated surface soils and selected subsurface soils have been removed to 12 feet and most affected residences have been connected to the public water supply. The two residences that share a well that is not connected to the public water supply system are upgradient the Site and are aware and responsible for maintaining the filters on the well. DCBP concentrations at all private wells are several orders of magnitude below the	

groundwater cleanup goal. The owners of the private well nearest the DCBP plume are connected to the public water supply. The Site lies within a Florida Delineated Contamination Area, which restricts well placement, but institutional controls to restrict groundwater use may be needed. The EPA should evaluate the need for an MOA between the EPA and SJRWMD to prevent access to contaminated groundwater until it is fully remediated. The EPA should select and implement a remedy for remaining subsurface soil and groundwater contamination and determine if institutional controls are necessary. The EPA should modify this remedy through an appropriate decision document. Bioavailability of wetland sediment exceedances should be evaluated to determine if additional response actions, including institutional controls, are needed. The EPA should evaluate whether the cleanup goals for DDD in surface and subsurface soils should be updated or if institutional controls are needed to restrict residential use. The EPA should sample for 1,4-dioxane, determine if it is present in site media and take additional action if necessary.

VIII. NEXT REVIEW

The next FYR Report for the Tower Chemical Co. Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Annual Wetland Restoration Monitoring Report, Tower Chemical Company Superfund Site, Clermont, Florida. Prepared by Black & Veatch for EPA Region 4. November 2013.

Five-Year Review Report, Tower Chemical Company Superfund Site, Clermont, Florida. EPA Region 4. April 18, 2013.

In Situ Solidification/Stabilization Treatability Study Report, Tower Chemical Company Superfund Site, Clermont, Florida. Prepared by Geosyntec Consultants for EPA Region 4. June 2017.

Interim Action Record of Decision, OU2, Tower Chemical Company Superfund Site, Clermont, Florida. EPA Region 4. August 23, 2000.

Record of Decision, OU1, Tower Chemical Company Superfund Site, Clermont, Florida. EPA Region 4. July 9, 1987.

Record of Decision, OU3, Tower Chemical Company Superfund Site, Clermont, Florida. EPA Region 4. September 14, 2006.

Remedial Action Report, OU3, Tower Chemical Company Superfund Site, Clermont, Florida. Prepared by Black & Veatch for EPA Region 4. November 2013.

Remedial Design Data Evaluation Report, Tower Chemical Company Superfund Site, Clermont, Florida. Prepared by Black &Veatch for EPA Region 4. September 2015.

Remedial Design Investigation Report, Tower Chemical Company Superfund Site, Clermont, Florida. Prepared by Geosyntec Consultants for EPA Region 4. March 2017.

Remedial Investigation/Feasibility Study, OU1, Tower Chemical Company Superfund Site, Clermont, Florida. EPA Region 4. December 1986.

Revised Final Supplemental Remedial Investigation/Feasibility Study, Tower Chemical Company Superfund Site, Clermont, Florida. EPA Region 4. April 17, 2006.

Technical Memorandum – Remedial Design Optimization Study, Tower Chemical Company Superfund Site, Clermont, Florida. Prepared by Black & Veatch for EPA Region 4. November 20, 2015.

APPENDIX B – CURRENT SITE STATUS

Environmental Indicators
- *Current human exposures at the Site are under control.* - *Current groundwater migration is not under control.*

Are Necessary Institutional Controls in Place?
☐ All ☒ Some ☐ None

Has EPA Designated the Site as Site-wide Ready for Anticipated Use?
☐ Yes ☒ No

Has the Site Been Put into Reuse?
☒ Yes ☐ No

APPENDIX C – SITE CHRONOLOGY

Table C-1: Site Chronology

Event	Date
TCC manufactured, produced and stored pesticides onsite	1957-1980
FDER discovered that acidic wastewater had reached Lake Apopka as a result of site activities	May 1980
The EPA conducted preliminary site assessment	May 1, 1980
The EPA proposed the Site for listing on the NPL	December 30, 1982
The EPA and TCC signed Unilateral Administrative Order for first emergency removal action	June 9, 1983
The EPA began first emergency removal action	June 27, 1983
The EPA completed first emergency removal action	July 16, 1983
The EPA finalized the Site on the NPL	September 8, 1983
The EPA began the RI/FS for OU1	March 30, 1984
The EPA conducted site inspection	June 1, 1984
The EPA completed the RI/FS for OU1 and signed the ROD for OU1	July 9, 1987
The EPA and TCC signed Consent Decree to begin remedial design for OU1	October 26, 1987
The EPA began remedial design for OU1	November 20, 1987
The EPA began second emergency removal action	February 8, 1988
The EPA completed second emergency removal action	July 13, 1990
The EPA completed remedial design for OU1	August 17, 1990
The EPA performed post-remedial design sampling and as a result deferred OU1 remedy	August 1991
The EPA began RI/FS for OU2	March 22, 1994
The EPA completed RI/FS for OU2	June 22, 1999
The EPA signed IROD for OU2	August 23, 2000
The EPA released Final Supplemental RI Report for OU2	August 23, 2001
The EPA began the remedial design for OU2	August 1, 2002
The EPA completed the remedial design and began the remedial action for OU2	September 27, 2002
The EPA completed the remedial action for OU2	August 21, 2003
The EPA began the RI/FS for OU3	October 2, 2003
The EPA completed the RI/FS and signed the ROD for OU3	September 14, 2006
The EPA began the first remedial design component for OU3 (surface soils, selected subsurface soils and sediment contamination)	September 27, 2006
The EPA signed Administrative Consent Agreement for OU3	April 4, 2007
The EPA issued first FYR	March 11, 2008
The EPA began first remedial action component for OU3 (surface soils, selected subsurface soils and sediment contamination)	October 28, 2009
The EPA completed first remedial design component for OU3	February 2010
The EPA completed part of remedial action for OU3 (residences adjacent to the Site, previously on carbon systems, were connected to city of Clermont public water)	May 2010
The EPA began remedial design for second component of OU3 (remaining contaminated subsurface soils and groundwater)	2011
The EPA completed first remedial action component for OU3	February 2012
The EPA issued the second FYR	April 18, 2013
The EPA issued Remedial Design Investigation Report for second component of OU3	March 2017
The EPA completed Treatability Study report for second component of OU3	June 2017

APPENDIX D – ADDITIONAL SITE BACKGROUND

Basis for Taking Action

The EPA completed the OU1 RI/FS in July 1987. Post-remedial design sampling found that there were significantly lower concentrations of soil contaminants than originally found in the RI/FS and cancelled the remedy implementation under OU1. The EPA completed the OU2 RI/FS in June 1999 and an OU2 supplemental RI in August 2001. The EPA decided to address immediate risk posed by offsite migration of site-related groundwater contaminants through an interim remedy (known as OU2). The EPA completed the OU2 RI/FS in June 1999 and an OU2 supplemental RI in August 2001. Subsurface soil data from the OU2 RI indicated considerably more soil contaminated with VOCs, SVOCs, and pesticides and their degradation products than identified in the OU1 RI/FS. The OU2 supplemental RI determined that the surficial and Floridan aquifers were contaminated with VOCs, SVOCs and 4,4'-DCBP. Most of the compounds were in surficial aquifer monitoring wells near the former wastewater pond. The OU2 human health risk assessment concluded that the Site posed unacceptable risks for current and future receptors in surficial groundwater and for future child residents in the surficial and Floridan aquifers. The ecological risk assessment concluded that the Site poses negligible ecological risk.

Response Actions

OU1

The EPA issued the OU1 Record of Decision (ROD) on July 9, 1987. It addressed contamination in soils, the surficial aquifer, surface water and sediment. In August 1991, post-remedial design samples indicated considerably lower concentrations of dicofol, the most toxic soil contaminant. The degradation product DCBP was found to have replaced dicofol as the soil contaminant of greatest concern. Based on these results, the EPA halted plans to remediate the Site pending further evaluation of data.

OU2

The EPA issued the OU2 IROD on August 23, 2000. Onsite and offsite groundwater sampling indicated that site-related contaminants including DCBP had migrated into the Floridan aquifer, which serves as the local water supply. The RAO established in the 2000 IROD was to minimize the risk posed by offsite migration of site-related groundwater contaminants through either the extension of a line from an alternate water supply or by implementing wellhead treatment of the potable water wells located in the immediate vicinity of the Site and drawing water from the Floridan aquifer.

The selected interim remedy included the following remedial activities:

- Potable well survey to identify well owners in the immediate vicinity of the Site who would like their wells to be outfitted with carbon absorption units.
- Installation of carbon units on six potable water wells located in the immediate vicinity of the Site.
- Groundwater monitoring to ensure that the carbon units are effectively removing organic compounds to below the cleanup goals and to confirm that the Floridan aquifer groundwater plume has not migrated beyond its current boundaries.

Response Actions

OU1

The EPA completed the remedial design for OU1 in August 1990. The EPA replaced one residential well in August 1991. Later that month, the EPA halted OU1 remedy implementation due to significantly lower concentrations of soil contaminants found during pre-excavation confirmation sampling.

OU2

The EPA began the remedial design for OU2 on August 1, 2002, and completed it on September 27, 2002. The remedial action included carbon filter installation with continued maintenance and groundwater monitoring. In January 2003, the EPA installed in-line carbon filtration systems on potable wells at six residences near the Site. Sampling of these wells in 2005 found no site-related contaminants. The wells were again monitored in October 2007, April 2009, and June 2011. One well slightly exceeded the cleanup goals for arsenic and cadmium in October 2007. In June 2011, one well exceeded the cleanup goal for lead and arsenic. However, the well had to be accessed through the wellhead fittings, which may have impacted the sample, as historical samples were below the cleanup goal.

APPENDIX E – PRESS NOTICE

The U.S. Environmental Protection Agency, Region 4 Announces the Third Five-Year Review for The Tower Chemical Co. Superfund Site, Clermont, Lake County, Florida

Purpose/Objective: EPA is conducting a Five-Year Review of the remedy for the Tower Chemical Co. Superfund site (the Site) in Clermont, Florida. The purpose of the Five-Year Review is to make sure the selected cleanup actions effectively protect human health and the environment.

Site Background: The 17-acre Site is located on County Road 455 in Clermont, Florida. From 1957 until 1980, the Tower Chemical Company (TCC) operated a pesticide manufacturing facility at the site. Wastewater from site operations was discharged to an onsite, unlined wastewater pond. Acidic wastewater was also disposed of on a spray irrigation field offsite, southwest of the wastewater pond. TCC also used a 1.5-acre burn area to dispose of solid chemical wastes through burning and burial of these wastes. In May 1980, the wastewater pond overflowed into an adjacent swamp and entered the unnamed stream west of the Site. The Florida Department of Environmental Protection (FDEP) discovered that acidic wastewater had reached Lake Apopka and reported that TCC discharges had caused defoliation at the spray irrigation field area. These incidents led FDEP to investigate the Site. As a result of these investigations, EPA listed the Site on the National Priorities List (NPL) in September 1983. Major contaminants at the Site included dichloro-diphenyl-trichloroethane (DDT), xylene, ethylbenzene, metals and semi-volatile organic compounds (SVOCs) in groundwater, DDT and its breakdown products in surface water, and volatile organic compounds (VOCs), SVOCs and pesticides in site soils and sediments.

Cleanup Actions: EPA designated three operable units (OUs) to address the Site's soil, sediment, groundwater and surface water contamination. EPA selected the remedy to treat soil, sediment, groundwater and surface water contamination in the Site's 1986 Record of Decision (ROD). During pre-cleanup sampling, EPA found considerably less contamination than anticipated and therefore decided not to carry out the cleanup plan. EPA selected an interim remedy to treat off-site groundwater contamination in the 2000 Interim Record of Decision (IROD). It included installation of carbon well filters, well filter maintenance and groundwater monitoring. EPA selected the final, site-wide remedy in the 2006 ROD, which replaced the OU1 cleanup plan. It included excavation of contaminated soils and sediments, in-situ treatment of remaining soil contamination, treatment of groundwater via bioaugmentation, connecting residents to the public water supply, implementation of temporary institutional controls, and groundwater monitoring.

Five-Year Review Schedule: The National Contingency Plan requires review of remedial actions that result in any hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure every five years to ensure the protection of human health and the environment. The Third of the Five-Year Reviews for the Site will be completed by April 2018.

EPA Invites Community Participation in the Five-Year Review Process: EPA is conducting this Five-Year Review to evaluate the effectiveness of the Site's remedy and to ensure that the remedy remains protective of human health and the environment. As part of the Five-Year Review process, EPA staff is available to answer any questions about the Site. Community members who have questions about the Site or the Five-Year Review process, or who would like to participate in a community interview, are asked to contact:

Karl Wilson, EPA Remedial Project Manager
Phone: (404) 562-9295
Email: wilison.karl@epa.gov

L'Tonya Spencer, EPA Community Involvement Coordinator
Phone: (404) 562-8463 | (800) 241-1754 (toll-free)
Email: spencer.latonya@epa.gov

Mailing Address: U.S. EPA Region 4, 61 Forsyth Street, S.W., 11th Floor, Atlanta, GA 30303-8960

Additional information is available at the Site's local document repository, located at Cooper Memorial Library, 2525 Oakley Seaver Drive Clermont, FL 34711 and online at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0400521.

APPENDIX F – INTERVIEW FORMS

Tower Chemical Co. Superfund Site **Five-Year Review Interview Form**

Site Name: Tower Chemical Co. **EPA ID No.:** FLD004065546

Interviewer Name: Karl Wilson **Affiliation:** EPA
Subject Name: Resident 1 **Affiliation:** N/A
Subject Contact Information: N/A
Time: 11:00 am **Date:** 09/27/2017
Interview Location: Resident's front door

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   Yes.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   It's been fine. They've done well testing and put us on city water.

3. What have been the effects of this Site on the surrounding community, if any?

   None.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   No, they haven't. A phone call would be fine.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   No, we're on city water.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?
   No.

Tower Chemical Co. Superfund Site **Five-Year Review Interview Form**

Site Name: Tower Chemical Co. **EPA ID No.:** FLD004065546

Interviewer Name: Karl Wilson **Affiliation:** EPA
Subject Name: Nearby Business 1 **Affiliation:** N/A
Subject Contact Information: N/A
Time: 10:30 am **Date:** 09/27/2017
Interview Location: Business location

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   Yes.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   It's a great thing.

3. What have been the effects of this Site on the surrounding community, if any?

   No effects.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   Yes. I don't know honestly.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   We're on city water. Most people around here are.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

   No.

Tower Chemical Co. Superfund Site **Five-Year Review Interview Form**

Site Name: Tower Chemical Co. **EPA ID No.:** FLD004065546

Interviewer Name: Karl Wilson **Affiliation:** EPA
Subject Name: Nearby Business 2 **Affiliation:** N/A
Subject Contact Information: N/A
Time: 10:45 am **Date:** 09/27/2017
Interview Location: Business front yard

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   Yes, I am.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   They did a good job. No problems.

3. What have been the effects of this Site on the surrounding community, if any?

   We don't drink water – we use city water.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   They test all the wells often, so we see them, but don't usually talk. They can call us.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes, we do. We don't use it normally, but we will use it when there's a hurricane or to wash cars.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

   No, everything's good.

APPENDIX G – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Tower Chemical Co.	**Date of Inspection:** 9/27/2017
Location and Region: Clermont, Florida 4	**EPA ID: FLD004065546**
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature:** Sunny/80s

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☒ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Surface soil and sediment excavation with offsite disposal and in-situ biodegredation and treatment with possible physical/chemical treatment enhancements.

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: See Appendix F for complete site interviews.

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency EPA
   Contact Karl Wilson (Name) | Remedial Project Manager (Title) | _____ (Date) | _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency FDEP
   Contact Kevin McCranie (Name) | Environmental Specialist III (Title) | _____ (Date) | _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone No.)

Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☐ Readily available ☐ Up to date ☒ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☐ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☒ No formal O&M at Site yet.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☒ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: No damage observed.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs posted along fenceline indicating no trespassing allowed.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☒ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☒ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: Site is currently within a Florida Groundwater Delineated Area, restricting wells. Soil institutional controls might be needed to restrict excavation of contaminated subsurface soils, depending on what is selected as the final remedy for remaining contamination. The EPA and SJRWMD are currently engaged in the process of forming a MOU to restrict access to contaminated groundwater.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☐ N/A

Remarks: Charlie's Auto Care has begun to operate onsite.

3. **Land Use Changes Off Site** ☐ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill

cover without creating erosion gullies.)

D. Cover Penetrations ☐ Applicable ☒ N/A

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

F. Cover Drainage Layer ☐ Applicable ☒ N/A

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps and Pipelines ☒ Applicable ☐ N/A

1. **Collection Structures, Pumps and Electrical**

   ☒ Good condition ☐ Needs maintenance

   Remarks: Swales and drainages in good condition downgradient of former wastewater flow area.

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

   ☐ Good condition ☐ Needs maintenance

   Remarks: _____

3. **Spare Parts and Equipment**

   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

   Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data

1. **Monitoring Data**

   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition

   ☐ All required wells located ☐ Needs maintenance ☐ N/A

   Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The purpose of the remedy is to protect human health and the environment from exposure to contaminated

	surface and subsurface soils, sediment and groundwater through direct exposure. The EPA has completed parts of the remedy, including installation of carbon well filters and subsequent water line extensions on affected residences and excavation of contaminated surface soils, selected subsurface soils and sediments. The EPA is currently evaluating options for treating remaining contaminated subsurface soils and groundwater. While the remedy is effectively fulfilling this purpose in the short term, institutional controls may be needed to restrict excavation activities and site groundwater use. There also may still be bioavailable contamination present in site wetland sediments.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. There is no formal O&M at the Site. The EPA conducts monitoring activities as appropriate and has performed several pilot studies using bioaugmentation to treat contaminted subsurface soils and groundwater. Several monitoring wells were noted to be unlocked and need to be locked in the future.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None identified.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. None identified.

Site Inspection Team:

Karl Wilson, EPA
Kevin McCranie, FDEP
Amanda Goyne, Skeo
Brice Robertson, Skeo

APPENDIX H – SITE INSPECTION PHOTOS

Gate entrance to commercial and RV storage area

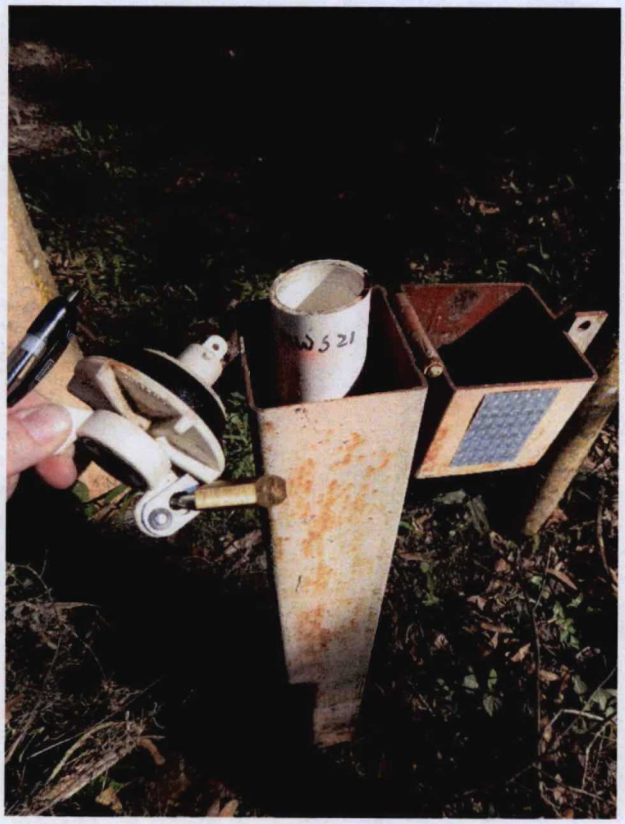
Auto body shop onsite

Looking east across former burn/burial area

Looking south to commercial and RV storage area

Looking southwest from relict sinkhole area with flush-mounted monitoring wells visible

Commercial and RV storage business onsite



Unlocked monitoring well MWS-21

Inactive carbon filtration system on private well (now used for non-potable purposes)

Non-potable water sign on residential tap north of the Site

Entrance signs to businesses onsite

Eastern wetland area

APPENDIX I – DATA FIGURES & TABLES

Figure I-1: Groundwater Sampling Results (2013-2017)

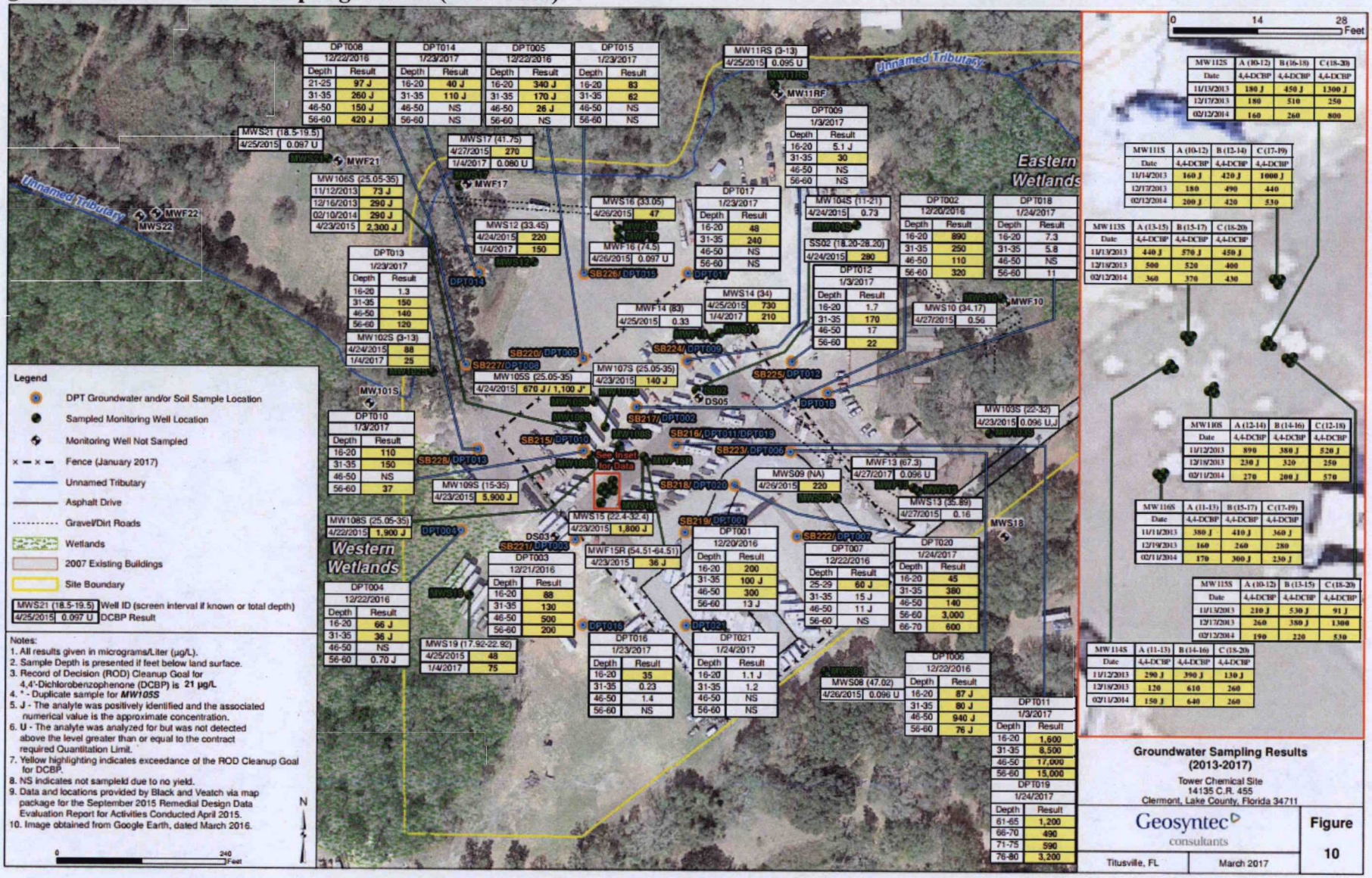


Table I-1: DPT Groundwater Analytical Results

Location	Depth (ft BLS)	Date	Concentration (µg/L)	
			4,4'-dichlorobenzophenone (DCBP)	Dicofol
Groundwater ROD Goals			21	0.08
DPT001	16-20	12/20/2016	200	0.080 U
	31-35		100 J	0.080 U
	46-50		300	0.080 U
	56-60		13 J	0.080 U J
DPT002	16-20	12/20/2016	890	0.079 U
	31-35		250	0.08 U
	46-50		110	0.08 U
	56-60		320	0.080 U
DPT003	16-20	12/21/2016	88	0.079 U
	31-35		130	0.080 U
	46-50		500	0.080 U
	56-60		200	0.080 U
DPT004	16-20	12/22/2016	66 J	0.080 U J
	31-35		36 J	0.079 U J
	56-60		0.70 J	0.080 U J
DPT005	16-20	12/22/2016	340 J	0.080 U J
	31-35		170 J	0.080 U J
	56-60		26 J	0.079 U J
DPT006	16-20	12/22/2016	87 J	0.080 U J
	31-35		80 J	0.080 U J
	46-50		940 J	0.080 U J
	56-60		76 J	0.080 U J
DPT007	25-29	12/22/2016	60 J	0.080 U J
	31-35		15 J	0.080 U J
	46-50		11 J	0.080 U J
DPT008	21-25	12/22/2016	97 J	0.080 U J
	31-35		260 J	0.080 U J
	46-50		150 J	0.080 U J
	56-60		420 J	0.080 U J
DPT009	16-20	01/03/2017	5.1 J	0.080 U J
	31-35		30	0.080 U
DPT010	16-20	01/03/2017	110	0.080 U
	31-35		150	0.080 U
	56-60		37	0.08
DPT011/ DPT019	16-20	01/03/2017	1,600	1.1 J
	31-35		8,500	3.8
	46-50		17,000	3.0
	56-60		15,000	5.5
	61-65	01/24/2017	1,200	80 U
	66-70		490	16 U
	71-75		590	20 U
	76-80		3,200	160 U
DPT012	16-20	01/03/2017	1.7	0.52
	31-35		170	0.080 U
	46-50		17	0.080 U
	56-60		22	0.72

Location	Depth (ft BLS)	Date	Concentration (µg/L)	
			4,4'-dichlorobenzophenone (DCBP)	Dicofol
Groundwater ROD Goals			**21**	**0.08**
DPT013	16-20	01/23/2017	1.3	0.080 U
	31-35		**150**	4.0 U
	46-50		**140**	4.0 U
	56-60		**120**	4.0 U
DPT014	16-20	01/23/2017	**40 J**	1.6 U
	31-35		**110 J**	4.0 U
DPT015	16-20	01/23/2017	**83**	3.2 U
	31-35		**62**	1.6 U
DPT016	16-20	01/23/2017	**35**	0.80 U
	31-35		0.23	0.080 U
	46-50		1.4	0.080 U
DPT017	16-20	01/23/2017	**48**	1.6 U
	31-35		**240**	8.0 U
DPT018	16-20	01/24/2017	7.3	0.32 U
	31-35		5.8	0.32 U
	56-60		11	0.32 U
DPT019	See DPT011/DPT019			
DPT020	16-20	01/24/2017	**45**	1.6 U
	31-35		**380**	16 U
	46-50		**140**	4.0 U
	56-60		**3,000**	80 U
	66-70		**600**	16 U
DPT021	16-20	01/24/2017	1.1 J	0.080 U
	31-35		1.2	0.080 U

Notes:

1. ft BLS - feet below land surface.
2. µg/L - micrograms per liter.
3. Indicates Exceedance of Record of Decision (ROD) Groundwater Goal.
4. Indicates that the analyte was analyzed for but was not detected; however, the detection limit was above the ROD Goal.
5. **Bold Type** - Indicates exceedance of a ROD Goal.
6. U - The analyte was analyzed for, but was not detected above the level greater than or equal to the Contract Required Quantitation Limit (CRQL).
7. J - estimated value; value may not be accurate.
8. DPT011 and DPT019 are the same location; DPT011 samples from shallow depths, DPT019 samples from deeper depths

Figure I-2: Soil Sampling Results (2012-2017)

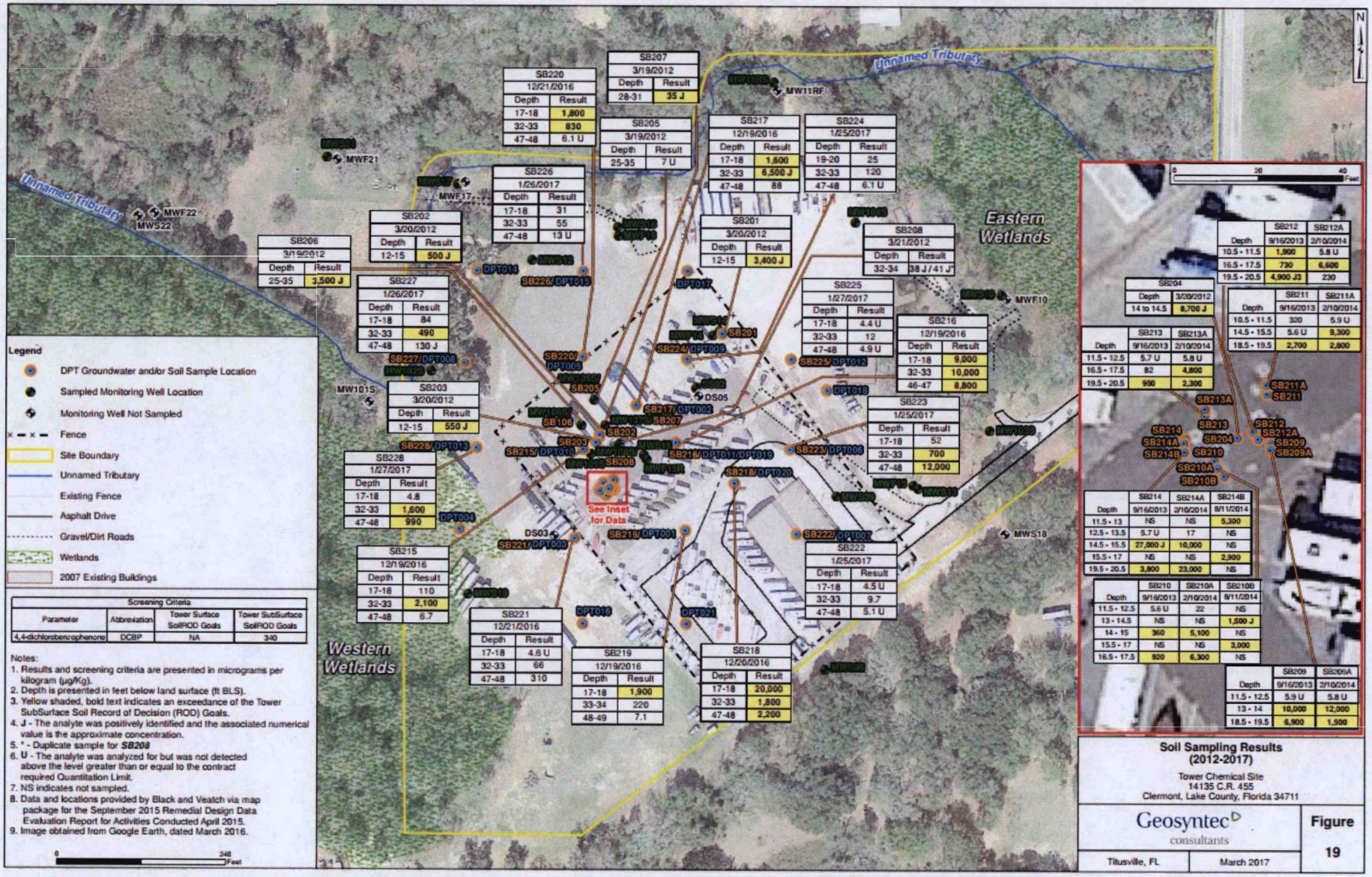


Table I-2: DPT Soil Analytical Results

Location	Depth (ft BLS)	Date	Concentration (µg/kg)	
			4,4-dichlorobenzophenone (DCBP)	Dicofol
Subsurface Soil ROD Goals			340	10
SB215	17-18	12/19/2016	110	4.9 U J3
	32-33		2,100	4.8 U J3
	47-48		6.7	6.0 U J3
SB216	17-18	12/19/2016	9,000	10 U J3
	32-33		10,000	4.7 U J3
	46-47		8,800	4.8 U J3
SB217	17-18	12/19/2016	1,600	9.3 U J3
	32-33		6,500 J3	4.6 U J3
	47-48		88	4.6 U J3
SB218	17-18	12/20/2016	20,000	18 U J3
	32-33		1,800	9.4 U J3
	47-48		2,200	19 U J3
SB219	17-18	12/20/2016	1,900	19 U J3
	33-34		220	5.6 U J3
	48-49		7.1	6.2 U J3
SB220	17-18	12/21/2016	1,800	4.8 U J3
	32-33		830	22 U J3
	47-48		6.1 U	6.1 U J3
SB221	17-18	12/21/2016	4.6 U	4.6 U J3
	32-33		66	5.0 U J3
	47-48		310	17 U J3
SB222	17-18	01/25/2017	4.5 U	4.5 U J3
	32-33		9.7	4.9 U J3
	47-48		5.1 U	5.1 U J3
SB223	17-18	01/25/2017	52	5.0 U J3
	32-33		700	4.8 U J3
	47-48		12,000	4.9 U J3
SB224	19-20	01/25/2017	25	4.5 U J3
	32-33		120	5.2 U J3
	47-48		6.1 U	6.1 U J3
SB225	17-18	01/26/2017	4.4 U	4.4 U J3
	32-33	01/27/2017	12	4.7 U J3
	47-48		4.9 U	4.9 U J3
SB226	17-18	01/26/2017	31	4.9 U J3
	32-33		55	4.9 U J3
	47-48		13 U	13 U J3
SB227	17-18	01/26/2017	84	4.3 U J3
	32-33		490	4.6 U J3
	47-48		130 J3	4.3 U J3
SB228	17-18	01/27/2017	4.8	4.7 U J3
	32-33		1,600	4.5 U J3
	47-48		990	47 U

Notes:

1. ft BLS - feet below land surrface.
2. µg/kg - micrograms per kilogram.
3. Indicates Exceedance of Record of Decision (ROD) Subsurface Soil Goal.
4. Indicates that the analyte was analyzed for but was not detected; however, the detection limit was above the ROD Goal.
5. **Bold Type** - Indicates exceedance of a ROD Goal.
6. U - The analyte was analyzed for, but was not detected above the level greater than or equal to the Contract Required Quantitation Limit (CRQL).
7. J3 - estimated value; valve may not be accurate, Spike recovery of relative percent difference outside of criteria.

APPENDIX J – DETAILED ARARS REVIEW TABLES

Groundwater ARARs

According to the 2006 ROD, cleanup goals for groundwater COCs were based on the lower of the National Primary Drinking Water Standards (40 CFR Part 141) and health-based GCTLs established by the FDEP under Florida Administrative Code (FAC) Chapter 62-777 (Table J-1). In the absence of a federal MCL or a health-based GCTL, the EPA calculated health-based cleanup goals for seven COCs: aluminum, copper, iron, manganese, chlorobenzoic acid, DCBP, and diphenyl methanone. This FYR compared current ARARs to ARARs specified in the 2006 ROD. As shown in Table J-1, the ARARs have not changed for any of the groundwater COCs nor have any new ARARs been established for the No ARAR Identified (NAI) COCs except for DCBP and copper. The current DCBP GCTL is 210 µg/L, but site-specific considerations have established a more protective ROD cleanup goal of 21 µg/L. The current MCL for copper is 1,300 µg/L, which is the same as the current ROD cleanup goal.

Table J-1: Previous and Current ARARs for Groundwater COCs

Groundwater COC	2006 ROD ARAR (µg/L)[a]	Current ARAR (µg/L)	ARAR Change
Acetone	6,300	6,300	No Change
Benzene	1	5	Less Stringent
alpha-BHC	0.006	0.006	No Change
Bromodichloromethane	0.6	0.6	No Change
Chlorobenzene	100	100	No Change
Chlorobenzilate	0.1	0.1	No Change
Chlorobenzoic acid	NAI[b]	NAI	No Change
Chloroform	70	70	No Change
1,4-Dichlorobenzene (para-Dichlorobenzene)	75	75	No Change
DCBP	NAI[c]	210	See Note c
Dicofol	0.08	0.08	No Change
Diphenyl methanone	NAI[b]	NAI	No Change
Methylene chloride (dichloromethane)	5	5	No Change
2-Methylnaphthalene	28	28	No Change
3-Methylphenol	35	35	No Change
4-Methylphenol	3.5	3.5	No Change
Naphthalene	14	14	No Change
1,2,3-Trimethylbenzene	10	10	No Change
1,2,4-Trimethylbenzene	10	10	No Change
1,3,5-Trimethylbenzene	10	10	No Change
Aluminum	NAI[d]	NAI	No Change
Arsenic	10	10	No Change
Cadmium	5	5	No Change

Groundwater COC	2006 ROD ARAR (µg/L)[a]	Current ARAR (µg/L)	ARAR Change
Chromium	100	100	No Change
Copper	NAI[e]	1,300	See Note e
Iron	NAI[f]	NAI	No Change
Lead	15	15	No Change
Manganese	NAI[g]	NAI	No Change
Nickel	100	100	No Change
Vanadium	49	49	No Change

Notes:

[a] According to the ROD, the chemical-specific ARARs are the lower of National Primary Drinking Water Standards (40 CFR Part 141) available at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations#seven or Florida health-based Contaminant Cleanup Target Levels (FAC Chap 62-777).

[b] The ROD did not identify a numerical ARAR for this COC. A health-based value of 1,400 µg/L was calculated in the absence of an established GCTL following 2005 Florida GCTL guidance.

[c] The ROD did not identify a numerical ARAR for this COC. EPA calculated a health-based value of 21 µg/L as the cleanup goal, which is more protective than the current Florida GCTL of 210 µg/L.

[d] The ROD did not select the GCTL for aluminum because the GCTL is a secondary MCL. The final cleanup goal was a health-based value of 7,000 µg/L calculated following 2005 Florida GCTL guidance.

[e] The ROD did not select the GCTL for copper because the GCTL is a secondary MCL. The final cleanup goal was 1,300 µg/L based on an EPA Office of Water MCL goal.

[f] The ROD did not select the GCTL for iron because the GCTL is a secondary MCL. EPA developed a residential health-based level of 4,700 µg/L based on a HQ of 1.

[g] The ROD did not select the GCTL for manganese because the GCTL is a secondary MCL. EPA selected an EPA Office of Water lifetime drinking water health advisory of 300 µg/L as the cleanup goal.

Soil ARARs

The 2006 ROD identified the SCTLs in FAC Chapter 62-777, published April 17, 2005, as the ARARs for soil (Table J-2). The current cadmium SCTL for the protection of groundwater is 7.5 milligrams per kilogram (mg/kg). However, based on the site-specific leachability models, a more stringent level of 2.2 mg/kg was calculated to be the cleanup goal instead of the SCTL. The current DCBP SCTL for leachability is 25 mg/kg but site-specific considerations have established a more protective ROD cleanup goal of 0.34 mg/kg. As shown in Table J-2 below, the ARARs have not changed for any of the soil COCs since the 2006 ROD.

Table J-2: Previous and Current ARARs for Soil COCs

Soil COC	2006 ROD ARAR (mg/kg)	Current ARAR (mg/kg)	ARAR Change
Surface Soils (residential direct contact) (0 feet to groundwater)[a]			
alpha-BHC	0.1	0.1	No Change
Chlordane	2.8	2.8	No Change
4,4'-DDD	4.2	4.2	No Change
4,4'-DDE	2.9	2.9	No Change
4,4'-DDT	2.9	2.9	No Change
Dieldrin	0.06	0.06	No Change
Toxaphene	0.9	0.9	No Change
Arsenic	2.1	2.1	No Change
Lead	400	400	No Change

Soil COC	2006 ROD ARAR (mg/kg)	Current ARAR (mg/kg)	ARAR Change
All Soils (groundwater protection) 0 feet to 12 feet[b]			
Benzene	0.007	0.007	No Change
Chlorobenzilate	0.1	0.1	No Change
Dicofol	0.01	0.01	No Change
Methylene chloride	0.02	0.02	No Change
Trimethylbenzene	0.3	0.3	No Change
DCBP	NAI[c]	25	See Note c
alpha-BHC	0.0003	0.0003	No Change
Chlordane	9.6	9.6	No Change
4,4'-DDD	5.8	5.8	No Change
4,4'-DDE	18	18	No Change
4,4'-DDT	11	11	No Change
Dieldrin	0.002	0.002	No Change
Toxaphene	31	31	No Change
Aluminum	NAI[d]	NAI	No Change
Cadmium	NAI[c]	7.5	See Note e
Chromium	38	38	No Change
Iron	NAI[d]	NAI	No Change
Lead	NAI[d]	NAI	No Change
Manganese	NAI[d]	NAI	No Change
Nickel	130	130	No Change

Notes:

[a] Residential SCTLs established under FAC 62-77, finalized April 17, 2005.

[b] Leachability-based SCTLs established under FAC 62-77, finalized April 17, 2005.

[c] Leachability-based value of 0.34 mg/kg developed by EPA and FDEP (EPA, 2003) as cited in the 2006 ROD, which is more protective than the current Florida SCTL of 21 mg/kg.

[d] Site-specific leachability-based levels for aluminum, iron, lead and manganese of 1,900 mg/kg, 5,600 mg/kg, 220 mg/kg, and 81 mg/kg, respectively in the absence of a leachability-based SCTL.

[e] Site-specific leachability-based level of 2.2 mg/kg was used instead of the SCTL, because the site-specific level is more stringent than the SCTL available in 2006.

APPENDIX K – DETAILED TOXICITY REVIEW

A screening-level vapor intrusion evaluation was conducted to assess the protectiveness of the remedy for this pathway due to the presence of volatile organic compounds (VOCs) in the subsurface. The only currently occupied enclosed structure onsite is an auto body shop. The vapor evaluation was conducted using EPA's vapor intrusion screening levels (VISLs) by identifying the maximum concentration of VOCs detected in the most recent surficial groundwater sampling event. The surficial zone groundwater is most appropriate to use since this zone is closest to the foundation of the building. The maximum concentrations were identified in wells that are over 350 feet west of this building. Typically, vapor intrusion is evaluated when a plume is within 100 feet of an enclosed structure. However, to be conservative the maximum concentrations of VOCs were used in the VISL. As shown in Table K-1 below, the results of the screening-level industrial risk evaluation indicate that the cancer risks are within or below the EPA's risk management range of 1×10^{-6} to 1×10^{-4} and equal or below the noncancer HQ of 1, respectively. These results are conservative and are expected to be lower as monitoring wells closer to the building such as MW104S or MW09S were below detection or much lower than the maximum values detected. Further, ventilation in the auto body business is expected to be much higher than for an enclosed office building as the business has large doors that remain open during the business operations. The results of the screening-level evaluation indicate that vapor intrusion from the subsurface is not an exposure pathway of concern for current land use conditions.

Table K-1: Screening-Level Vapor Intrusion Risk Evaluation Using Surficial Groundwater

COCs[a]	Maximum Concentration[b] (µg/L)	VISL Calculator[c]	
		Industrial Risk	Industrial Noncancer HQ
Surficial Zone			
Benzene	0.97J (MWS14)	1×10^{-7}	0.002
Bromodichloromethane	4U (MW107S)	1×10^{-6}	-
Chlorobenzene	44 (MW107S)	-	0.03
1,4-Dichlorobenzene	210 (MW107S)	2×10^{-5}	0.006
Methylene chloride	40U (MW107S)	4×10^{-9}	0.002
Naphthalene	2.7 (MW109S)	1×10^{-7}	0.004
1,2,4-Trimethylbenzene	130 (MW107S)	1×10^{-7}	1
1,3,5-Trimethylbenzene	35 (MW107S)	-	-
Xylenes	280 (MW107S)	-	0.2

Notes:

a. Chemicals that are considered to be volatile as denoted in the VISL calculator.
b. Based on maximum 2015 concentration detected in shallow wells monitored at the Site. Values obtained from Table 3-3 from the September 2015 Remedial Design Evaluation Report.
c. Risk and HQ calculated using the EPA's VISL Calculator version 3.5.1 for groundwater using a default average temperature for shallow groundwater of 25 degrees Celsius: http://www.epa.gov/vaporintrusion (accessed 12/7/2017).
- The EPA has not yet established an inhalation toxicity value for this pathway.

To determine if the cleanup goals for soil remain protective for residential use, the cleanup goals were compared to EPA's 2017 RSLs for residential use, since the RSLs incorporate current toxicity values and standard default exposure factors.

The evaluation of surface soil cleanup goals (Table K-2) shows that except for DDD, the cleanup goals represent concentrations that are within or below the EPA's risk management range of 1×10^{-6} to 1×10^{-4} and below the noncancer HQ of 1.0 for residential use. Similarly, for subsurface soils (Table K-3), except for DDD, the subsurface cleanup goals represent concentrations that are within or below the EPA's risk management range of 1×10^{-6} to 1×10^{-4} and below the noncancer HQ of 1.0 for residential use. The EPA should evaluate whether the cleanup goals for DDD in surface and subsurface soils should be updated or if other additional action needs to be taken. However, it should be noted that the Site is currently used for commercial/industrial purposes and the current cleanup goals for DDD in surface and subsurface soils are within or below the EPA's risk management range of 1×10^{-6} to 1×10^{-4} and below the noncancer HQ of 1.0 for commercial/industrial uses.

Table K-2: Health Evaluation of Surface Soil Cleanup Levels

COC	2006 ROD Cleanup Level (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1×10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
alpha-BHC	0.12	0.086	510	1×10^{-6}	0.0002
Arsenic	2.1	0.68	35	3×10^{-6}	0.06
Chlordane	2.8	1.7	35	2×10^{-6}	0.08
DDD	4.2	2.3	1.9	2×10^{-6}	**2**
DDE	2.9	2.0	23	1×10^{-6}	0.13
DDT	2.9	1.9	37	1×10^{-6}	0.08
Dieldrin	0.06	0.034	3.2	2×10^{-6}	0.02
Lead	400	400		NA[d]	
Toxaphene	0.9	0.49	NA	2×10^{-6}	--

Notes:

a. Current EPA RSLs, dated November 2017, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 12/7/2017).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1×10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. The EPA established the RSL for lead based on a blood lead model and not cancer or noncancer risk. The cleanup goal is equivalent to the EPA's screening level for residential land use.
NA = toxicity values not established by the EPA
-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.
Bold = noncancer HQ exceeds 1.0 or cancer risk exceeds 1×10^{-4}.

Table K-3: Health Evaluation of Subsurface Soil Cleanup Levels

COC	2006 ROD Cleanup Level (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1×10^{-6} Risk	HQ=1.0		
Organics					
Benzene	0.007	1.2	82	6×10^{-9}	0.00008
Methylene chloride	0.02	57	350	4×10^{-10}	0.00006
Trimethylbenzene	0.3	-	270	4×10^{-9}	0.001
Pesticides/Herbicides					
alpha-BHC	0.0003	0.086	510	4×10^{-9}	0.0000006
Chlordane	9.6	1.7	35	6×10^{-6}	0.3
Chlorobenzilate	0.1	4.9	1,300	2×10^{-8}	0.00008
DDD	5.8	2.3	1.9	3×10^{-6}	**3**

COC	2006 ROD Cleanup Level (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
DDE	18	2.0	23	9 x 10^{-6}	0.8
DDT	11	1.9	37	6 x 10^{-6}	0.3
DCBP	0.34	-	570	-	0.0006
Dicofol	0.01	-	-	-	-
Dieldrin	0.002	0.034	3.2	6 x 10^{-8}	0.0006
Toxaphene	31	0.49	NA	6 x 10^{-5}	-
Inorganic Compounds					
Aluminum	1,900	-	77,000	-	0.03
Cadmium	2.2	0.68	35	3 x 10^{-6}	0.06
Chromium	38	0.3	230	1 x 10^{-4}	0.2
Iron	5,600	-	55,000	-	0.1
Lead	220	400		NA[d]	
Manganese	81	-	1,800	-	0.04
Nickel	130	15000	1,500	9 x 10^{-9}	0.09

Notes:

a. Current EPA RSLs, dated November 2017, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 12/7/2017).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. The EPA established the RSL for lead based on a blood lead model and not cancer or noncancer risk. The cleanup goal is equivalent to the EPA's screening level for residential land use.

NA = toxicity values not established by the EPA

-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.

Bold = noncancer HQ exceeds 1.0 or cancer risk exceeds 1 x 10^{-4}.

APPENDIX L – ADDITIONAL SITE MAPS

Figure L-1: Current DCBP Plume Boundary and Private Well Locations